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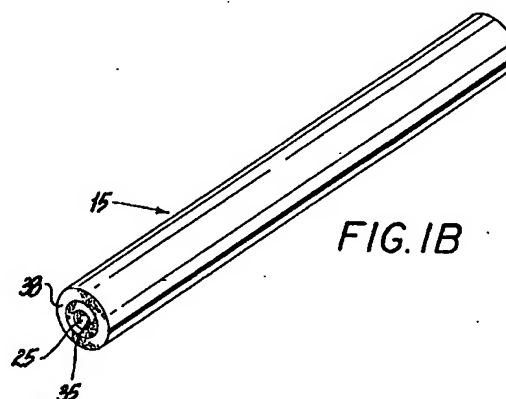
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(54) **Composite bioabsorbable materials and surgical articles made therefrom.**

(57) The present invention relates to composite materials having a core portion 25 formed from a first bioabsorbable material and at least one shell portion 35, 38 of a second bioabsorbable material joined to the core portion. The first and second bioabsorbable materials have different rates of bioabsorption. In a preferred embodiment, the core portion is coextruded with the shell portion to form a composite filament or sheet. The materials of the present invention may be used as sutures or formed into medical devices or surgical articles for implantation within a living organism.



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Although the composite bioabsorbable materials and processes for their manufacture have been described in terms of the preferred embodiments, numerous modifications will be readily apparent to those skilled in the art. For example, composite medical or surgical articles having a composite core/shell structure may be formed directly by coextrusion, injection molding, casting, etc. Composite materials having a core/shell structure may also be fabricated by lamination bonding techniques, e.g., hot isostatic pressing. Such techniques also result in composite materials whose mechanical properties may be described using the above rule of mixtures equation.

The claims which follow identify embodiments of the invention additional to those described in detail above.

#### Claims

1. A composite bioabsorbable filament implantable within a living organism comprising:  
a core portion formed from a first bioabsorbable material;  
a shell portion joined to said core portion, said shell portion formed from a second bioabsorbable material;  
said first and second bioabsorbable materials having different rates of bioabsorption.
2. A bioabsorbable filament as recited in claim 1 wherein said first bioabsorbable material has a greater rate of bioabsorption than said second bioabsorbable material.
3. A bioabsorbable filament as recited in claim 1 wherein said second bioabsorbable material has a greater rate of bioabsorption than said first bioabsorbable material.
4. A bioabsorbable filament as recited in claim 1, 2 or 3 wherein said bioabsorbable filament is formed by coextruding said core portion and said shell portion.
5. A bioabsorbable filament as recited in any one of the preceding claims wherein said first bioabsorbable material comprises a glycolide-containing polymer and said second bioabsorbable material comprises polydioxanone.
6. A bioabsorbable filament as recited in any one of the preceding claims wherein said first bioabsorbable material comprises polydioxanone and said second bioabsorbable material comprises polycaprolactone.
7. A bioabsorbable filament as recited in any one of the preceding claims wherein said shell portion comprises a first shell portion formed from said second bioabsorbable material and a second shell portion formed from a third bioabsorbable material, said second and third bioabsorbable materials having different rates of bioabsorption.
8. A bioabsorbable filament as recited in any one of the preceding claims further comprising a coating formed over said shell portion.
9. A suture formed from the bioabsorbable filament of any one of the preceding claims.
10. A woven or non-woven prosthetic device made from the composite filament of claim 1.
11. A composite bioabsorbable sheet implantable within a living organism comprising:  
a core portion formed from a first bioabsorbable material;  
a shell portion joined to said core portion, said shell portion formed from a second bioabsorbable material;  
said first and second bioabsorbable materials having different rates of bioabsorption.
12. A bioabsorbable sheet as recited in claim 11 wherein said first bioabsorbable material has a greater rate of bioabsorption than said second bioabsorbable material.
13. A bioabsorbable sheet as recited in claim 11 or 12 wherein said shell portion comprises a first shell portion formed from said second bioabsorbable material and a second shell portion formed from a third bioabsorbable material.

sorbable material, said second and third bioabsorbable materials having different rates of bioabsorption.

14. A method for making a composite bioabsorbable material comprising:

forming a first melt of a first bioabsorbable material;

forming a second melt of a second bioabsorbable material, said second bioabsorbable material having a different rate of bioabsorption than said first bioabsorbable material;

coextruding said first and second material melts to form a composite bioabsorbable material having a portion and a shell portion integral with said core portion such that said first melt forms said core portion and said second melt forms said shell portion.

15. A method for making a composite bioabsorbable material as recited in claim 14 wherein said coextrusion is performed through a spinneret to form a filament, said filament then being stretched to form a monofilament suture.